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A Precipitin Method for the Standardisation of "Old" Tuberculin.

AND THE EXPRESSION OF RESULTS IN STANDARD UNITS.

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OLD tuberculin, since its discovery by Koch in 1890, has been used extensively as a diagnostic, prognostic, and therapeutic agent in tuberculosis. Unfortunately, the proportion of the active principle of tuberculin present in different samples is not constant—as judged by the reactions they produce—but varies considerably, even when the method of preparation is more or less standardised. It is apparently influenced by several factors, such as the strain of *B. tuberculosis* used, the composition of the medium, the age of the culture, and the method of concentration. Although the active principle has not yet been isolated, numerous methods have been used to estimate the relative amounts of it present in different samples of tuberculin. The fact that its use is attended with some danger—an excessive dose may produce a severe general reaction—makes it necessary, in clinical work, to know with reasonable accuracy the strength or toxicity of each sample used; and in scientific work it is, of course, imperative, in order to obtain comparable results.

METHODS OF STANDARDISATION IN PRESENT USE.

The methods of standardisation in vogue at present are:—

1. The determination of the lethal dose for tuberculous guinea-pigs. This is the official German method as used by the Staatsinstitut für Experimentelle Therapie in Frankfurt A/M.[1 2 3]
2. Von Lingelsheim's intracerebral method on normal or tuberculous animals.[4]
3. The quantitative von Pirquet, and the intradermal reaction on tuberculous guinea-pigs.[5 6]
4. The quantitative von Pirquet on human tuberculous subjects.[7 8]

The methods depending on the use of tuberculous animals have certain inherent disadvantages. Tuberculous guinea-pigs, even though infected at the same time with the same amount of inoculum, may show great variation in the extent of the resulting lesions. And even when the lesions are apparently similar the animals may show great variation in sensitiveness to the same dose of the same tuberculin. Therefore, in order to obtain reasonably accurate results it is necessary to use a large number of animals—which makes the method troublesome and expensive. These disadvantages apply even to the intradermal test, where both the standard and unknown tuberculin are used on the same animal, because different parts of the skin vary greatly in sensitiveness. Furthermore, unless the animal is in exactly the right stage of sensitisation the reaction may be very ill-defined; and even at best it is often difficult, if not impossible, to distinguish between two lesions caused by two different dilutions of the same tuberculin, unless the one is at least double the strength of the other.

Von Lingelsheim's method has the advantage that it can be used on normal animals, but it is applicable only to tuberculin which is free of glycerine, the latter being highly toxic for the nerve cells. The most satisfactory in vivo test is probably the quantitative von Pirquet, on human cases of tuberculosis, as modified by Ellerman and Erlandsen,[7] or by Cummins.[8] Even in this test it is difficult to distinguish between the lesions produced by the same quantity of two dilutions of the same tuberculin of less than 100 per cent. difference in strength. Furthermore, the test may be accompanied by some inconvenience and discomfort to the patient, as the lesions frequently persist from a week to a month before disappearing.

In consideration of these difficulties, it would obviously be of great advantage to have an in vitro test for the standardisation of old tuberculin. The complement-fixation reaction has been applied for this purpose, but the number of reagents employed and the difficulty of standardising them bring in several unavoidable sources of error which would tend to preclude it from being a satisfactory quantitative test.

It seemed to us that an in vitro test, involving the least possible number of reagents, whereby it would be possible readily and accurately to compare tuberculins of unknown strength with an established standard would be desirable, and that a precipitin test was likely to fulfil these requirements.

PRECIPITATING POWER OF A SERUM FOR TUBERCULIN.

The first difficulty which presented itself was to obtain a serum of high precipitating power for tuberculin. Calmette[9] and others have prepared sera which would precipitate tuberculin, and we obtained

two samples of serum which had been prepared by immunisation of a horse with the whole bacillus. We found that their precipitating power for tuberculin was relatively weak, and furthermore, as Calmette had previously found, that the precipitation was not specific, since the serums precipitated mallein to about an equal extent. It was found that by the use of diaplyte (defatted) *B. tuberculosis* vaccine[10] to immunise a horse, a serum could be obtained which had a high precipitating power, not only for its specific precipitinogen, obtained by digesting the diaplyted bacilli with trypsin, but also against old tuberculin. It did not precipitate mallein, diphtheria toxin, or concentrated broth controls; its precipitating power for tuberculin was from 200 to 800 times as strong as that of the other serums which we tried.

However, the preliminary quantitative experiments showed that in comparing two tuberculins, very discrepant results were obtained, depending on the relative quantities of serum and tuberculin used. Using concentrated tuberculin, or dilutions up to about 1 in 50 with a constant quantity of serum, the precipitation increases with the decreasing amounts of tuberculin; but with high dilutions, ranging from 1 in 500 to 1 in 30,000, depending on the strength of the tuberculin, the degree of precipitation decreases with the quantity of tuberculin present. This being the case, it became necessary to work out in detail the whole quantitative relationship between serum and tuberculin. The details of these experiments, which are chiefly of theoretical interest, will be published later. The practical outcome of them was that it was found possible to measure with considerable accuracy the strengths of different dilutions of the same tuberculin or of different tuberculins.

Technique.

The technique which we have evolved for the standardisation of tuberculins by the precipitin method will now be described in detail.

(A) Reagents and Apparatus Required.

(1) Standard tuberculin; (2) standard precipitating serum; (3) normal saline for diluting serum and tuberculin; (4) Dreyer agglutination tubes and stands; (5) accurately graduated measuring pipettes, Dreyer dropping pipette, and dilution tubes; (6) water-bath, 37·5°C.; (7) artificial-light arrangement for reading tubes against dark background; (8) six-magnification hand lens.

Details are as follows:—

1. The standard tuberculin we have used is the German Standard Tuberculin, kindly supplied by Geheimrat Prof. Dr. Kolle. It is the standard used by the Staatsinstitut für Experimentelle Therapie, Frankfurt A/M.

2. The precipitating serum, as stated above, was obtained by immunising a horse with diaplyte *B. tuberculosis* vaccine. The horse received weekly injections, intravenously, of doses increasing from 0·1 mg. to 225 mg., over a period of three months.

3. The sterile normal saline is prepared by dissolving 9·0 g. of chemically pure sodium chloride in 1000 c.cm. of freshly distilled water, and immediately sterilising in the autoclave.

4. The agglutination tubes employed are those used for the Dreyer agglutination technique. The inside diameter of these tubes is 5·5—6·2 mm.; the outside diameter is 6·6—7·2 mm., and the length is 58 mm. The bottom is conical and the top is flanged to facilitate filling. These tubes, and all other glassware, must be thoroughly cleaned in acid, and then washed in distilled water until all traces of acid are removed. The tubes are then sterilised by dry heat. Agglutination stands containing three rows of 20 holes for agglutination tubes are the most convenient.

5. Pipettes, accurately graduated to *contain* 0·1 c.cm., 1·0 c.cm., 5·0 c.cm., and 10·0 c.cm., respectively, are required. The Dreyer dropping pipette, as used in the standard agglutination technique, has a total length of 19 cm., length of capillary portion, 2·8 cm.; outside diameter of body of pipette, 5·0—5·4 mm.; outside diameter of capillary portion, 2·36—2·41 mm.; bore of capillary portion, 0·5 mm. The dilution tubes are test-tubes, 18 by 2·5 cm., without lips. They re sterilised by dry heat without plugging.

6. The water-bath must be regulated to maintain a constant temperature of 37·5°C., and should be provided with a device to keep the water-level constant. A satisfactory arrangement is described by Dreyer and Ward.[12]

7. An artificial-light arrangement for reading the tubes is essential, and it should be used in a darkened room. An adjustable lamp, fitted with an ordinary plain conical shade, covered on the outside with dull-black paper, is suitable. The end of the bulb should not project appreciably beyond the edge of the shade, and the lamp should be so arranged that the observer does not look directly into the light. The tubes to be read are held against the edge of the shade, the lower end tilted towards the observer, and the meniscus of the fluid in the tube should be slightly above the lower edge of the shade. It is desirable to place a dull-black cardboard on the table, and another resting against the farther edge of the lampshade, so that the observer may look through the tube against a dark background. A frosted bulb of 20 candle power is satisfactory. A stronger light obscures the finer degrees of precipitation, and should not be used.

8. A compound six-magnification hand lens of reputable make.

(B) Method of Diluting the Tuberculin.

Seven dilution tubes are placed in a stand and sterile saline is measured into them, the first receiving 9·9 c.cm., and each of the others 10·0 c.cm.; 0·1 c.cm. of tuberculin is measured in the 0·1 c.cm. pipette. The outside and tip of the pipette are wiped free of tuberculin, and the contents are blown out into the first tube. The viscous tuberculin sticks to the walls of the pipette, and must be washed out by carefully aspirating the mixture in the tube and blowing out again. To ensure thorough washing of the pipette, this should be done 30 times. For this purpose it is convenient to use a teat. If the supply of tuberculin is not limited, this first dilution may be made in a similar manner, using 99 c.cm. of saline and 1·0 c.cm. of tuberculin. Having thus obtained a 1/100 dilution, further dilutions of 1/300, 1/900, 1/2700, 1/8100, and 1/24300 are made as follows. With the 5·0 c.cm. pipette, measure 5·0 c.cm. of the 1/100 dilution into tube 2. Wash the pipette in the dilution by aspirating several (at least 10) times, and after thorough mixing, carry over 5·0 c.cm. of this dilution into tube 3, and so on until the required number of dilutions has been made.

(C) Method of Setting up Test.

Place a row of 20 agglutination tubes into the stand. With the standard dropping pipette, measure out into the tubes the following quantities of saline, tuberculin dilution, and serum dilution in the order named. (See Table 1.)

Table I.

Tube No.	Saline (drops)	Tuberculin.	S.S. (drops)	Tube No.	Saline (drops)	Tuberculin.	S.S. (drops)
1	3	12	5½	11	3	12	5½
2	5	10 Drops	,,	12	5	10 Drops	,,
3	7	8 1/300	,,	13	7	8 1/2700	,,
4	9	6	,,	14	9	6	,,
5	10	5	,,	15	10	5	,,
6	3	12	,,	16	3	12	,,
7	5	10 Drops	,,	17	5	10 Drops	,,
8	7	8 1/900	,,	18	7	8 1/8100	,,
9	9	6	,,	19	9	6	
10	10	5	,,	20	10	5	,,

S.S. = Standard Serum.

One and the same pipette must be used throughout the whole operation. When changing from one reagent to another, or from one dilution to another, the pipette should be carefully washed out with distilled water, and dried by washing through with acetone, followed by gentle heating over a Bunsen burner. The use of an ordinary suction pump will greatly facilitate the washing and drying of the pipette.

When the reagents have been added to the tubes shake each one thoroughly in order from right to left—i.e., beginning with the tube containing the highest dilution of tuberculin. Place the stand in an *open water-bath* (not in a dry-air incubator) at 37·5°C., and arrange the water level so that the *column of fluid in the tubes is only one-half to two-thirds immersed.* Precipitation is greatly facilitated by this procedure.

It is desirable to put up each of the unknown tuberculins to be tested and each of the standards in duplicate. Two or more standard tuberculins should be used in each test, but if only one is available four or five dilutions of it should be made up independently to secure a true average of the readings of the standard tuberculin. As a general rule, it is necessary to put up only 15 tubes in each row—using the dilutions 1/900, 1/2700, and 1/8100 or 1/2700, 1/8100, and 1/24300. With strong tuberculins it is necessary to use the higher dilutions, and all but the very weak ones will show a good reaction in the 1/900 dilution after nine hours' incubation. In the case of very weak tuberculins, on the other hand, one may have to begin with dilutions of 1/100, 1/300, etc. If the lower dilutions of strong tuberculins are used, a precipitate will come down almost immediately after the serum is added, but different tuberculins are found to have different reaction times, and the end-point is not usually reached until after nine hours' incubation. If left for a longer time the precipitation loses some of its sharpness, and is more difficult to read; also the danger of infection becomes greater.

(D) Reading of Results.

The tubes are read in the manner already indicated under (A) 7. To secure uniform readings by different observers it is desirable to use permanent tubes showing standard and trace precipitation for comparison. The principal terms used in describing the different degrees of precipitation met with are: Total (T), standard (S), trace (tr), and nil (0). Total precipitation indicates a condition where the fluid in the tube has become quite clear, with a relatively large bulk of precipitate settled down at the foot of the tube. Standard indicates a degree of precipitation that can be seen readily with the naked eye. The fine particles are evenly distributed, of uniform size, and definitely separated from one another. Trace is the term applied to a very fine precipitation, barely visible to the naked eye, but readily visible with the six-magnification lens. Nil indicates that no visible precipitation has taken place, though the fluid may show some opacity.

Naturally there are degrees of precipitation which fall in between total, standard, trace, and nil; total minus (T −), where the fluid is clear, and the particles are large and well separated, and some have fallen to the foot of the tube. On either side of standard precipitation there is standard plus (S +) and standard minus (S −). In the former the particles are larger than those seen in standard precipitation; they are uniformly distributed, and clarification is more marked; in the latter is seen a finer precipitation than standard. Similarly, there is a trace plus (tr +) and a trace minus (tr −), the former representing something more than a trace but less than a standard minus, and the latter being a very fine degree of precipitation visible only with the six-magnification lens. In addition, a condition where there is only a very slight opacity, or an extremely fine degree of precipitation, barely visible with the six-magnification lens is designated as trace query (tr ?).

(E) Expression of Results in Standard Units.

The strengths of all tuberculins are expressed in standard units. We have chosen the Frankfurt standard tuberculin as the standard comparison, and have arbitrarily assigned to it a value of 100 units per c.cm. The value of any other tuberculin in standard units is inversely proportional to the smallest amount required to produce the same degree of precipitation as the standard with the same quantity of serum under the same conditions. Thus, if twice the quantity of tuberculin X is required to produce the same degree of precipitation as the standard tuberculin under the same condition, its strength is one-half of the standard —i.e., 50 units per c.cm.

(F) Calculation of Units.

The unit value is calculated from those tubes in the series which show standard and trace precipitation respectively. The unit value is calculated for each of these two tubes separately, and the average is taken as the unit value of the tuberculin. If there are no tubes in the series showing exactly standard and trace precipitation, it is necessary to interpolate for these values—e.g., if tube 4 shows S + and tube 5 shows S −, S would be intermediate between them. In Tables II., III., IV., and V. are shown the method of recording readings and calculating results.

Table II.—Examples of Readings.

Tube No.	Tuberculin— Quantity in drops.	Standard.	"A"	"B"	"C"
		Dilution 1/900.			
1	12	T	T	T	T
2	10	T	T −	T	T
3	8	T	S	T	T
4	6	T	S −	T	T
5	5	T	tr	T −	T
		Dilution 1/2700.			
	12	T −	tr −	S	T
6	10	S +	tr ?	S −	T
8	8	S	0	tr	S +
9	6	S −	0	tr −	S −
10	5	tr	0	tr ?	tr +
		Dilution 1/8100.			
11	12	tr −	0	0	tr −
12	10	tr ?	0	0	0
13	8	0	0	0	0
14	6	0	0	0	0
15	5	0	0	0	0

Table III.—Calculation from Standard Readings given in Table II.

Tuberculin.	Quantity of tuberculin in drops.	Reciprocals.	Units.
Standard ...	8 × 1/2700 = 0·00296	338·0	100
"A" ...	8 × 1/900 = 0·00889	112·5	33
"B" ...	12 × 1/2700 = 0·00445	222·5	66
"C" ...	7 × 1/2700 = 0·00259	386·0	114

Table IV.—Calculation from Trace Readings given in Table II.

Tuberculin.	Quantity of tuberculin in drops.	Reciprocals.	Units.
Standard ...	5 × 1/2700 = 0·00185	540	100
"A" ...	5 × 1/900 = 0·00555	180·5	34
"B" ...	8 × 1/2700 = 0·00296	338	63
"C" ...	13·5 × 1/8100 = 0·00167	600	111

Table V.—Average of Standard and Trace Calculations in Tables III. and IV.

Standard tuberculin = 100·0 units per c.cm.
Tuberculin "A" = 33·5 ,, ,,
,, "B" = 64·5 ,, ,,
,, "C" = 112·5 ,, ,,

For the accurate measurement and standardisation of tuberculin it is desirable—as in all other quantitative work —to make several determinations and to take the average

as the final figure. We find that at least five determinations are required to give accurate results. Fresh dilutions should be made for each determination. The standard tuberculins must, of course, be put up each time with the unknown tuberculin, because slight variations in the time of incubation and in the temperature and water level of the water-bath have an appreciable effect on the degree of precipitation. Although the actual readings of any tuberculin may vary slightly from day to day its value, relative to the standard, should remain constant.

(G) Precautions to be Observed.

1. The serum, must, of course, be absolutely clear and sterile. We have found that the Seitz laboratory filter is very efficient and satisfactory for removing sediment and contamination from serum, and it does not take out the precipitin. The serum must *not* be heated. The extent to which a serum may be diluted to give satisfactory precipitation will vary with its strength. The serum we have used gave good results when diluted 1 in 4.

2. Antiseptics, such as phenol, trikresol, or formalin should not be added to any of the reagents, as experiments have shown that when these antiseptics are present in a concentration sufficiently great to prevent bacterial growth, they interfere with the reaction and change the character of the precipitation.

3. The agglutination tubes which are used for the test must be of the diameter laid down. If tubes of larger diameter are used, the character of the precipitate changes and does not give sharp readings.

4. All glassware must be scrupulously clean.

5. The water-bath must be *open* and the temperature must be accurately regulated, and must be kept constant at 37·5°C. The water level must be carefully adjusted, so that only one-half to two-thirds of the column of fluid in the tube is immersed.

Results.

A series of carefully prepared dilutions of a sample of old tuberculin was made up by one of us and labelled *h*, *o*, *e*, *y*, and *x* respectively, and was tested and calculated by the other who did not know the key. In Table VI. are given the actual strength of the solutions, and the values found on a single determination.

Table VI.

Tuberculin labelled.	Tuberculin unit per c.cm.	Tuberculin unit per c.cm. found by precipitin test.	Percentage deviation.
h	100	93·28	6·72
o	45	46·58	3·51
e	27	27·59	2·19
y	12	12·12	1·00
x	5	5·04	0·80
		Average	2·84

Having thus established the theoretical accuracy of the method, it was necessary to compare different samples of old tuberculin to see whether the degree of precipitation depended entirely on the amount of active principle of tuberculin present, or if it were influenced by the proportion of peptone, salts, and glycerine in various samples. There appeared to be no correlation between the degree of precipitation and the amount of non-specific material in the tuberculins. Thus it will be seen from Table VII. that the strength of sample British 6 is only about 41 per cent. of sample British 5, while its viscosity was found to be three to four times as great.

In Table VII. are given the results obtained by examining 30 different commercial tuberculins of varying origin, taking the Frankfurt standard tuberculin as our standard. It is at once seen that different commercial tuberculins may vary enormously in strength—namely, from 33·2 to more than 400 units per c.cm. Furthermore, it was found that certain samples of tuberculin—namely, British 2, 3, and 4 alleged to be equal in strength to the Frankfurt standard—varied considerably. These tuberculins were found to contain 135·1, 33·2 and 46·0 units per c.cm. respectively, instead of 100·0. This being the case, it became necessary to test these samples, together with certain others showing great differences

Table VII.

Tuberculin.	Units per c.cm. precipitin test.	Tuberculin.	Units per c.cm. precipitin test.
Frankfurt standard (1).	100	Frankfurt standard (1).	100
British 2 ...	135·1	Belgian 22 ...	254·0
,, 3 ...	33·2	,, 23 ...	249·8
,, 4 ...	46·0	French 24 ...	50·9
,, 5 ...	244·7	,, 25 ...	62·0
,, 6 ...	100·5		
,, 7 ...	69·5		
,, 8 ...	119·6		
,, 9 ...	95·2		
,, 10 ...	190·9	Veterinary Tuberculin.	Units as above.
,, 11 ...	138·1		
,, 12 ...	117·8	Frankfurt standard (1).	100·0
,, 13 ...	271·3		
,, 14 ...	60·0		
,, 15 ...	35·4		
Oxford 16 ...	44·1	British 26 ...	6·4
German 17 ...	39·6	American 27 ...	14·8
American 18 ...	269·0	,, 28 ...	29·6
,, 19 ...	304·8	,, 29 ...	131·3
Danish 20 ...	421·6	Belgian 30 ...	19·8
,, 21 ...	47·5	French 31 ...	18·3

in strength by a recognised in vivo method, to find out if the results obtained by the precipitin test were borne out by the in vivo test. In our hands the quantitative von Pirquet reaction on human cases of tuberculosis gave the most satisfactory results, and it seemed likely that from the point of view of diagnosis and treatment of tuberculosis in man by means of tuberculin this method of standardisation should prove of greater value than tests on animals.

In our experiments, Cummin's modification of the von Pirquet reaction was used. A metal plate, 1·5 mm. in thickness, with a circular hole 4·0 mm. in diameter, is pressed firmly on to the forearm, so that the skin seen through the hole presents a slightly convex surface. The epidermis is scratched off within the circle by a sharp surgical needle, exposing the *cutis vera*. The scratching must not be sufficiently deep to draw blood. Two parallel rows of six scratched areas are prepared in this way, and six dilutions containing 2, 4, 8, 16, 32, and 64 per cent. of tuberculin respectively are rubbed gently into the exposed cutis using the blunt end of the needle, which has been previously dipped into the tuberculin. The standard tuberculin is applied to one row and the unknown to the other. The reactions are read at the end of 24 and 48 hours—by direct comparison of the lesions produced by the standard and unknown tuberculin. The intensity of the reaction is judged by the infiltration, colour, pustule formation, etc.

Each series of dilutions of each tuberculin was marked with a different letter, before being given to

the persons (A. D. G. and F. G. H.) who carried out the test on the patient. The tests were read independently by G. D. and A. D. G., and the key to the tuberculins was in no case divulged until the final readings had been made.

In Table VIII. are given the result of the in vivo test of ten of the tuberculins recorded in Table VII. The results are expressed in standard units per c.cm., taking the Frankfurt standard tuberculin as equal to 100 units. The letters *a*, *b*, and *c* indicate tests on different patients. Each figure given in columns 3 and 4 represents the average of from two to five readings on the same patient. The individual readings from which the averages were obtained varied in some cases as much as 400 per cent. In columns 5 and 6 are given the average of all readings made by G. D. and A. D. G. respectively, and in the last column the average of all the readings made by the two observers. From the table it is seen that the results obtained by two different persons reading the same test may vary considerably, and that the values found for the same tuberculin when tested on different patients may show marked variations.

TABLE VIII.—HUMAN CUTANEOUS TEST.

Tuberculin.	Test.	Units per c.cm.				
		Read by—		Average of readings.		Average of readings by G.D. and A.D.G.
		G.D.	A.D.G.	G.D.	A.D.G.	
F.S. 1	—	*100·0*	*100·0*	*100·0*	*100·0*	*100·0*
Brit. 2	*a*	110·1	137·0	110·1	137·0	123·6
,, 3	*a*	36·4	24·6	44·9	50·5	47·7
,, 3	*b*	53·4	76·4	—	—	—
,, 4	*a*	55·2	62·6	41·9	50·1	46·0
,, 4	*b*	28·6	37·6	—	—	—
,, 5	*a*	200·1	207·2	200·1	207·2	203·7
,, 6	*a*	57·5	81·9	57·8	74·0	65·9
,, 6	*b*	58·1	66·1	—	—	—
Ger. 17	*a*	83·3	102·5	75·3	80·7	78·0
,, 17	*b*	88·1	104·1	—	—	—
,, 17	*c*	54·6	35·4	—	—	—
Amer 18	*a*	474·0	689·4	395·2	475·4	435·3
,, 18	*b*	316·5	327·5	—	—	—
,, 18	*c*	395·0	409·4	—	—	—
Dan. 20	*a*	237·6	109·1	237·6	109·1	173·4
,, 21	*a*	34·1	51·1	69·0	48·2	58·6
,, 21	*b*	98·8	42·3	—	—	—
,, 21	*c*	74·0	51·1	—	—	—

F.S. = Frankfurt Standard. Brit. = British. Ger. = German. Amer. = American. Dan. = Danish.

In Table IX. are recorded the results obtained by the precipitin and the in vivo tests respectively. It is seen that in the case of the Frankfurt standard tuberculin, and British 2, 3, and 4, the differences in strength found by the precipitin test is entirely borne out by the in vivo test. On the whole, the results obtained by the two methods run parallel. The average percentage deviation of the in vivo test results from those obtained by the precipitin test was found to be 34·54 for the ten tuberculins recorded.

TABLE IX.

Tuberculin.		Units per c.cm.		Deviation of B from A in per cent.
		A. Precipitin test.	B. Human cutaneous test.	
Frankfurt standard	1	*100·0*	*100·0*	0·00
British	2	135·1	123·6	− 8·51
,,	3	33·2	47·7	+43·68
,,	4	46·0	46·0	0·00
,,	5	244·7	203·7	−17·77
,,	6	100·5	65·9	−34·43
German	17	39·6	78·0	+96·98
American	18	269·0	435·3	+61·83
Danish	20	421·6	173·4	−58·87
,,	21	47·5	58·6	+23·37
Average	... ...			34·54

From the data presented above, it seems justifiable to suggest that a satisfactory in vitro reaction for the standardisation of old tuberculin has been devised. There may be certain possibilities of error, as in the case of the standardisation of diphtheria toxin by Ramon's precipitation method,[11] where it is found that the change of the toxin to the toxoid by chemical or physical influences is not accompanied by any change in the precipitating properties of the toxin. We have been unable to detect any change either in the toxicity, as tested on tuberculous guinea-pigs, or in the precipitating properties of old tuberculin, when subjected to a temperature of 0°C. for six months, or to a temperature of 100° C. for 15 days, or to autoclaving for two hours at two atmospheres. Tuberculin, therefore, seems to be comparatively stable to temperature changes, and under ordinary condition, the precipitation and in vivo tests on any sample should continue to run parallel. If this is borne out by a longer series of experiments, the great advantage of the in vitro test is obvious. The time and expense required is reduced to a minimum, and a very high degree of accuracy can be obtained by comparing each unknown tuberculin with the standard tuberculin using a precipitating serum of standard strength.

In conclusion, we wish to express our warmest thanks to Captain S. R. Douglas, F.R.S., Prof. J. B. Buxton, and Major G. W. Dunkin for preparing the precipitating serum at the National Institute for Medical Research. Also to Dr. A. D. Gardner and Dr. F. G. Hobson, for their kind help in carrying out the von Pirquet tuberculin test, and to Dr. G. R. Girdlestone for the facilities accorded us at the Wingfield Orthopædic Hospital. Further, to Geheimrat Prof. Dr. Kolle for kindly supplying us with the Frankfurt standard tuberculin, and to Dr. R. A. O'Brien, of the Wellcome Research Laboratories, for certain samples of tuberculin, and similarly to Prof. C. O. Jensen, of the Veterinary High School, Copenhagen. Our special thanks are due to Miss Jörgensen for the great assistance she has rendered us in the performance of the tests.

REFERENCES.

1. Koch, R.: Weitere Mitteilungen über das Tuberkulin, Deutsche med. Wochenschrift, 1891, No. 43.
2. Dönitz, W.: Untersuchungen über die Wertbestimmung des gewöhnlichen Tuberkulins, Klin. Jahrb., Band vii., 1898.
3. Otto, R., und Hetsch, H.: Die staatliche Prüfung der Heilsera und des Tuberkulins, Arbeiten aus dem Staatsinstitut für Experimentelle Therapie und dem Georg Speyer-Hause zu Frankfurt a/M., Heft 13, p. 107.
4. v. Lingelsheim: Uber die Wertbestimmung der Tuberkulosegiftpräparate, Deutsche med. Wochenschrift, 1898, No. 37.

5. Eagleton, A. J.: The Standardisation of Tuberculin, The Lancet, 1921, i., 429.
6. Eagleton, A. J., and Baxter, E. M.: The standardisation of Tuberculin, Brit. Jour. Exp. Path., 1923, p. 289.
7. Ellermann, V., and Erlandsen, A.: Das Gesetz der Tuberkulinreaktion und ihre Anwendung bei der Standardisierung von Tuberkulin, Beiträge zur Klinik der Tuberkulose, Band xvi., Heft 1, p. 1.
8. Cummins, S. L.: The Cutaneous Tuberculin Test, Brit. Med. Jour., 1924, i., 186.
9. Calmette, A., and Massol, L.: Sur la précipitation des tuberculines par le serum d'animaux immunisés contre la tuberculose, Compt. rend. Académie des Sciences, Nov. 8th, 1909.
10. Dreyer, Georges: Some New Principles in Bacterial Immunity: their Experimental Foundation and their Application to the Treatment of Refractory Infections, Brit. Jour. Exp. Path., 1923, iv., 146.
11. Ramon, G.: Sur la toxine et sur l'anatoxine diphtériques, Annales de l'Institut Pasteur, xxxviii., 1924, 1.
12. Dreyer, Georges, and Ward, H. K.: The Serum Diagnosis of Syphilis, Medical Research Council, Special Report Series, No. 78, 1923, p. 94.

Law Report.

High Court of Justice: King's Bench Division.

What is Milk?

Bridges v. Griffin.

(Before the Lord Chief Justice, Mr. Justice Avory, and Mr. Justice Shearman).

This was a case stated by the justices of the Petty Sessional Division of Stow-on-the-Wold. The appellant, Jack Bridges, an inspector under the Sale of Food and Drugs Acts, at 9-30 a.m. on September 8th, 1924, bought from John William Oakley Robinson, a roundsman in the employment of John Griffin, the respondent, a pint of milk, which, on analysis, was found to be deficient in milk-fat to the extent of 46 per cent. The respondent stated that he had instructed Robinson always to stir the milk before drawing it off from the churn. The justices found that the milk was put into the churn at about 7-30 a.m. in the same state as it came from the cow, and that no one in the meantime had access to the churn or could have tampered with the milk, which was stated by counsel to have been drawn off by a tap at the bottom of the churn.

The justices dismissed the summons against the respondent for selling milk not of the nature, substance, and quality demanded by the purchaser.

The question at issue, therefore, amounted to this:— Is it "abstraction," within the meaning of the Milk Regulations, when the cream simply rises to the top of the churn by the process of nature, and the milk drawn off from the bottom of the churn was in consequence naturally deficient in fat?

Mr. S. L. Porter, K.C., and Mr. R. C. Hutton appeared for the appellant; Mr. R. A. Willes for the respondent.

Mr. Porter in his argument referred to:— Dyke v. Gower ([1892] 1 Q.B., 220), Hunt v. Richardson (32 *The Times* L.R., 560; [1916] 2 K.B., 446), Few v. Robinson ([1921] 3 K.B., 504), Knowles v. Scott ([1918] S.C., (J.), 32), Penrice v. Brander ([1921] S.C. (J.), 63).

Mr. Willes said that there was no finding by the justices that the milk was drawn from the bottom of the churn, nor that it was not stirred. The Court had to deal with the case as stated. It had been urged that if the justices were right the door would be opened to fraud, but that was a matter for legislation. The respondent was not charged with abstracting under section 9, but with selling to the prejudice of the purchaser under section 6 of the Sale of Food and Drugs Act. The Milk Regulations did not lay down a standard of what was milk, but merely provided that if it failed to reach a certain standard it should be presumed to be adulterated either by addition of water or abstraction of fat. Where, as here, the prosecution relied on the analyst's certificate only, it was a complete defence to prove that it had been put in the churn in the condition in which it came from the cow, and that it could not have been tampered with. He referred to Williams v. Rees (87 L.J., K.B., 639) and Grigg v. Smith (88 L.J., K.B., 488).

The Lord Chief Justice: All the judges in that case came to the conclusion reluctantly and expressed the hope that there would be legislation upon it. Has it ever been considered?

Mr. Willes: I do not know, but I fancy that the difficulty is to find any definition of milk.

The Lord Chief Justice: You seem to suggest that the question has been considered and put aside on account of its difficulty; another possibility is that it has never been considered at all.

Mr. Willes, continuing, said that, unless the Court was prepared to hold that there was a statutory duty to stir milk, unstirred milk was as genuine as stirred milk. He referred to Kings v. Merris ([1920] 3 K.B., 566).

Judgment.

The Lord Chief Justice, in his judgment, after referring to the case, said that he thought it was reasonably clear that the argument had proceeded on the footing that the question was whether there could be said to be abstraction of milk-fat where all that had happened was that the seller had put the milk in bulk into some receptacle, had allowed the cream to rise to the top, and had afterwards sold as new milk something which, owing to the construction of the receptacle and the means of exit from it, had been drawn from the bottom.

His Lordship referred to the terms of the Sale of Food and Drugs Acts and the Milk Regulations, 1901. The regulation did not purport to contain a definition; its object was to furnish a means of proof. In the present case an analyst's certificate was put in showing a deficiency of 46 per cent. in milk fat.

It was to be observed that the milk which was to be presumed under the regulation to be adulterated was the milk which was sold; not the bulk, but the actual sample. The certificate having been put in, the burden was shifted to the respondent to show that the milk was genuine. Accordingly he undertook the kind of defence which had been well known since Hunt v. Richardson (*supra*), namely, that the milk which was sold was in the condition in which it came from the cow. In Hunt v. Richardson (*supra*) it was found expressly that nothing had been added to or subtracted from the milk.

The important moment was the moment of sale, and the important milk was the milk that was sold. It was not sufficient to say that there was a time when it formed part of milk which was in its natural state. In the present case the justices found that when the milk was put in the churn it was as it came from the cow; there was no finding that the sample was in that condition, and the argument was that the milk, having been allowed to stand for some time, the lower part was in a condition in which the cream had risen to the top.

Dyke v. Gower (*supra*) was, as it were, the converse of the present case. [His Lordship referred in some detail to the report of that case, in which the milk having been served first from the top of the vessel, the residue was deficient in fat.] What was done there was said to be abstraction, but from what? From the portion of the milk which was sold. It was not by dipping a measure in the milk that the cream was drawn from the lower portion of the milk, it was by natural processes that the cream rose to the top. What was the distinction between that case and the present? The charge against the defendant was that he sold milk which was not genuine. If a seller put milk into a receptacle knowing that the cream would rise to the top, and afterwards sold from the bottom, could he say that the milk so denuded of its cream was in the condition in which it came from the cow?

That question had been discussed in two cases in Scotland. [His Lordship made detailed references to Knowles v. Scott (*supra*) and Penrice v. Brander (*supra*).] In the result those cases brought one back to the phrase employed in Dyke v. Gower (*supra*), "owing to a neglect to keep the milk stirred." The Scottish case, of course, was not binding on the Court, but was entitled to great respect, and the reasoning seemed to harmonise with that in Dyke v. Gower (*supra*).

In these circumstances he thought that there was nothing on which the justices could find that this milk was in the condition in which it came from the cow. The true conclusion was that the milk was not of the nature, substance, and quality demanded. There was evidence that the respondent knew well the consequences that would follow if the milk was not stirred. There was no evidence that it was impracticable to keep the milk stirred. In his opinion the appeal ought to be allowed.

Mr. Justice Avory and Mr. Justice Shearman delivered judgment to the same effect.

Solicitors: Messrs. Gibson and Weldon, for Messrs. Wellington, Clifford, and Matthews, Gloucester; Messrs. Smiles and Co., for Messrs. Steel and Broom, Stow-on-the-Wold.

Light Draught Horses.

SUGGESTIONS FOR IMPROVING THE BREED.

A correspondent to *The Times* writes:

"No civilised country perhaps has ever adopted such a negligent attitude as England with respect to a matter of such national importance as horse breeding. We have been justly styled the stud farm of the world, but it is not due to any help derived from the Government that we achieved such a position. The English country gentlemen, yeomen, and farmers improved the various horse breeds of the country without any assistance or encouragement. Things have been very different in other countries. Nor has wisdom always guided the counsels of the breeders and those who guided them. A difficulty arose, or some "new fashion" came along with a more or less violent change of type which did an infinite amount of harm. A violent change of type which does away with a well-established class of horse that has shown its value for many years, and is the accumulation of centuries of experience, upsets horse breeding very seriously. It brings into being very frequently a much inferior class of horse.

"The fate of the Holderness cart horse is a case in point. Few people now living have much recollection of the Holderness cart horse in the days when he was at his best. He was a smart, active, clean-legged horse, standing rather under than over 16 hands, and he could do his share of the work on the land with the best, for he was of the untiring sort. There was a very considerable mixture of thoroughbred blood in his veins. In the middle and latter part of the 18th century all over the East Riding of Yorkshire thoroughbred sires were travelling at a low fee. Sir Mark Masterman Sykes and his successor, Sir Tatton Sykes, sent some really good horses into the country, and in course of time with the foundation there was to work upon a fine type of light draught horses filled the country, mares that could take their share of work on the land and breed a Leicestershire hunter. When Howden Fair was in its heyday the Holderness farmers took strings of four-year-olds, and the Lincolnshire farmers from the Brocklesby and Burton countries met them there and bought their horses. After giving them a year's schooling in Lincolnshire they sold then at high prices. The four-year-olds made up to £160 or £170 and occasionally up to £200. When the Shire Horse Society was formed, and, indeed, before that date, horses of the approved Shire type were making abnormal prices and every one rushed to cross their mares with the Shire, without any care being taken to preserve the good breed they possessed. In vain Mr. John Daniel, of York, and other good judges and men of experience warned them of the danger. Now what they prophesied has come true, and throughout the country among horsemen the cry is "Where are our light draught horses?"

"The case is critical, no doubt, but it is not so critical as some would make out. We have, it is true, been guilty of some very foolish policy in the past. About a hundred years ago we sent shiploads of Cleveland Bay mares to the Continent, and the wise use the German Government made of them may be seen by anyone who takes the trouble to read Burchard von Oettingen's able book, "Horse Breeding in Theory and Practice." A little encouragement at the proper time would have prevented many a blunder on the part of British breeders. The King's premiums have done an immense amount of good—how much only those can tell who have watched the show-ring closely—and the excellent and level classes which came into the ring at Islington are a sufficient proof that our horse-breeding industry is not in as hopeless a state as some would have us suppose.

"But upon the light draught mare depends the future of light horse breeding. It is essential that the mare that breeds the light horse of the future should earn her living and rather more on the farm. When this is the case the stock she breeds becomes so much "found money." It is practically all profit, and so it should be when the risks and costs are taken into consideration. Where, then, are we to get the light draught mares? The Cleveland Bay cross is the best possible, for the Cleveland Bay mare can take her full share of the work of the land, and, if wisely mated, she will breed a horse of high class. But Cleveland Bay mares are so few nowadays that it would be a foolish policy to breed anything but Cleveland Bays from them. But the Cleveland Bay sire mated with the short-legged and as far as possible clean-legged cart-mare, of which there are still a few to be found in the country, especially in the higher lands, would soon produce the right sort of mare. Then there is a very good sort of mare that has been seen by the writer—a cross between the Clydesdale stallion and the thoroughbred mare. Memory recalls one bred like this that could take her half of a plough and also carry a man in the right place over a big country. But great care must be taken about the Clydesdale's shoulders, and one of the best judges known to the writer said the only satisfactory test was to gallop him down hill. Then we have another resource, and that a very valuable one, our pony breeds, some of which might be very valuable in establishing a breed of light draught horses.

"There is another matter in which the breeder requires considerable assistance, and that is in the establishing of a market by which he will get his fair share of the profits, a state of things which does not prevail nowadays. This, however, could perhaps be provided if the right people were to undertake it."

Foot-and-Mouth Disease.

At a meeting on May 5th, of the Central and Associated Chambers of Agriculture, a report by the Cattle Diseases Committee, presented by Professor Penberthy, declared that "in a matter of such importance as the inquiry into the recent widespread outbreaks of foot-and-mouth disease it is urgent that the minutes of evidence should be published." The Committee reported the receipt of the following resolution from the Cheshire Chamber:—

"That this Chamber is of opinion that the disastrous spread of foot-and-mouth disease from Blackpool and Fleetwood to Crewe and elsewhere in 1923 was entirely due to the action of the Veterinary Department of the Ministry of Agriculture in nullifying without sufficient investigation their own Order made only three days previously, and further views with the greatest dismay the approval of this action embodied in the report of the Departmental Committee just issued."

The Committee, continued the report, saw no reason for differing from the views expressed in this resolution.

Sir Henry Rew said that in fairness to the members of the Committee and others concerned, who gave their time and energy to the inquiry, the evidence should be published.

The report was adopted.

The Veterinary Record.

16th May, 1925.

STANDARD TUBERCULIN.

Correspondence which has reached us shows that considerable interest has been aroused by the reference in our columns recently to the report of the Tuberculin Committee of the Medical Research Council. There has been already expressed a widespread desire to see demonstrations of the intradermal method of making the tuberculin test, and more attention has been focussed upon the necessity of obtaining tuberculin which can be relied upon to give reliable results. We publish this week a paper by G. Dreyer and R. L. Vollum on a method of standardising tuberculin which we have reprinted from the *Lancet*, and which we think will give some proof of the unreliability of many of the tuberculins at present on the market. Of thirty samples tested, of both British and foreign manufacture, not one conformed to the Frankfürt standard, and no two of them were found to be of the same potency, one being more than four times stronger and others only half or less than half as strong. It is, of course, to be understood that there must necessarily be a co-relation between strength *in vitro* and potency *in vivo*, and we look forward to the publication, in the not-far distant future, of the results of further researches in determining the true relative potency of all commercial tuberculins. To the practitioner who does not rely upon one brand only, the present variableness is a very serious matter, and may vitiate the test to such an extent as to render it valueless. We admit that the difference between brands is not so important in the case of the intradermal test, but that is a point in favour of the latter. In the case of the subcutaneous test it is of very great importance and only to a slightly less degree in the ophthalmic test. So many general practitioners have come to regard the subcutaneous test as entirely reliable that it will come almost as a shock to some that any question should be raised on the point.

The tuberculin test is daily becoming recognised as a scientific experiment, and as such it requires proper scientific control and interpretation. It is essential that both the tuberculin and the thermometer should be reliable and of standard quality. We would add a very important corollary—that the man who makes the test must be reliable also. We say this advisedly, for it is common knowledge that on occasion the taking of temperatures has been left to laymen, many of whom are scarcely to be trusted even with a clinical thermometer, while other laymen have been left to put their own interpretation upon the results of the ophthalmic test.

Laxity on one part will only result in the test being carried out more and more by agriculturalists themselves. We must aim at the most punctilious exactitude and we must do our utmost to obtain and use material of standard value. It would be difficult at the present time to restrict the use of tuberculin to the veterinary and medical professions, but it would be an advantage, though, even so, its misuse, if such was intended, would be almost impossible to prevent.

We sincerely hope, however, that some step will be taken at an early date to standardise tuberculin and regularise its sale. Whether such steps may be possible under the Therapeutic Substances Bill is doubtful, as veterinary preparations are expressly excluded from the purview of the Bill. We have always contended, and are now more than ever convinced that this is a mistaken policy, but we are not hopeful of a favourable change until we have a permanent veterinary establishment under the Ministry of Health.

Rowett Experimental Stock Farm.

The Rowett Institute of Research in Animal Nutrition, Aberdeen, has received a sum of money for a permanent endowment for the maintenance of an experimental stock farm to be carried on in connection with the institute. The donor is Mr. Duthie Webster, a Shorthorn breeder of Tarves, Aberdeenshire, and the gift is intended as a memorial to his uncle, the late Mr. William Duthie, of Collynie, and his grandfather of the same name. The farm is to be called the Duthie Experimental Farm. After the death of his uncle Mr. Webster inherited the famous Collynie collection of Shorthorns.

Humane Slaughtering of Animals.

A report issued by the Sanitary Committee of the Public Health Department of the Corporation of London, states that the Committee passed a resolution declaring that, "the time is now opportune for definite regulations to be framed to control and regulate the slaughtering of animals intended for human consumption, and, furthermore, is of opinion that any additional powers in this connection should be of general application throughout the country; and that in order to secure uniformity, such regulations should be issued as compulsory regulations framed by the Ministry of Health."

ABSTRACTS.

(A Study of the Serology, the Cerebro-Spinal Fluid and the Pathological Changes in the Spinal Cord in Dourine. By HARRY W. SCHOENING, Veterinary Inspector, and ROBERT J. FORMAD, Pathologist, Pathological Division, Bureau of Animal Industry, United States Department of Agriculture. Published in *The Journal of Agricultural Research*, Washington. Vol. XXVI., No. 10, December 8th, 1923).

The authors describe the investigations carried out in a stallion by frequent serological tests, both during life covering a period of eight years, between 1913 and 1921, by means of the fixation of the complement method, and also after the death of the animal by submitting the spinal fluid to the fixation of the complement test, the colloidal gold test, a test for globulin and also to a cell count. The stallion showed no clinical symptoms of dourine during the period under review until shortly before its death, and although its blood was examined at frequent intervals demonstration of the *Trypanosoma equiperdum* was never possible, nevertheless, its blood serum was always positive to the fixation of the complement test for dourine.

The colloidal gold test as practised by Lange on the cerebro-spinal fluid of syphilitic patients, and as has been practised on the spinal fluids of horses in the campaign waged against dourine, was carried out after the death of this horse, and is described at some length. As no spinal fluid from a healthy horse was available for control, the spinal fluids from three calves which had died from artifically infected blackleg were used instead. Spinal fluids from such cases were negative as a rule to this test. Although the results generally obtained by these tests in horses were somewhat similar, no definite interpretation could be put on them, as the cords were not available for histopathological study. It is of interest to note that the spinal fluid of this special horse when subjected to the complement fixation test for dourine gave a complete fixation of the complement of 4+ with 0.05 c.c. of spinal fluid, while the serum of the same animal gave only an incomplete fixation of the complement of 3+ with 0.2 c.c. of serum, the same antigen and same hæmolytic serum being used in each case.

No attempt was made to study the microscopic changes in the peripheral nerves, the larger nerve trunks, the sympathetic system nor the spinal ganglia; the spinal cord alone being examined. The changes in the spinal cord are summarised by the authors as follows: "Slight hypertrophy and pronounced capillary distension were present in the dura and pia mater, but no visible alteration in the arachnoid. The capillary fulness in the lateral horns of the grey substance suggestive of hæmorrhage was less pronounced in the white substance.

"Neurogliar changes were present in the grey and white substance, but were better seen in the lateral columns when stained by the Golgi method.

"The sensory ganglion cells were somewhat shrunken, while the motor cells were practically unaltered in outline.

"Degenerative changes in the myelin were quite visible by the Pal-Weigert hæmatoxylin method, and even more so by Heller's osmic acid method. It is more readily seen in the fibres of the dorsal than the lateral columns and is scarcely found in the ventral columns."

(JENKINS, J. R. W. **Observations on the Life History of Tapeworms of the Genus Moniezia.** Ann. App. Biol., xi., No. 3-4, pp. 339-348, 1 pl. Cambridge, October, 1924. Ex Rev. Appl. Entomology).

A study has been made of the life-histories of tapeworms of the genus *Moniezia* commonly parasitic upon lambs in the Aberystwyth district, including an attempt to determine the manner of infection, presupposing the existence of an intermediate host. Observations recorded seem to refute the theories that infection occurs through the ewe, or that a milk diet is essential for the development of the larval form of the worm. In a survey of thirty-four infected farms, the only possible intermediate hosts discovered were slugs, dung beetles and dung-living staphylinids and mites, all of which live under the best possible conditions for the ingestion of tapeworm eggs. Worms of all ages are found in very young lambs, and practically all the lambs in an infected flock are infected, indicating that the intermediate host must be a commonly occurring species. As slugs and dung beetles, including *Onthophagus nuchicornis*, *Aphodius fossor*, *A. fimetarius*, *A. merdarius* and *A. haemorrhoidalis*, are the commonest of the pasture-living forms at lambing time, attention was confined to these two groups, and the slugs and each species of dung beetle were fed with mature proglottides, which they ate with avidity, but the results were entirely negative. The sheep ked, *Melophagus ovinus*, was then tested, but also with negative results, attempts to feed the flies on *Moniezia* eggs proving a failure.

Victoria Veterinary Benevolent Fund.

A meeting of Council of the Victoria Veterinary Benevolent Fund was held at 10 Red Lion Square, London, W.C.1, on Thursday, April 2nd, 1925, when there were present: Mr. S. H. Slocock (President) in the chair, Major J. Abson, Prof. J. F. Craig, Prof. S. H. Gaiger, Major-General Sir John Moore, Mr. W. D. Rees, Mr. Arnold Spicer, Mr. E. Alfred West, Mr. J. Willett and Prof. G. H. Wooldridge.

1. *Minutes.* The minutes of the previous meeting, having been printed and published, were taken as as read and signed as correct.

2. *Apologies for Absence.* Letters of apology for absence were received from Messrs. H. J. Dawes, P. J. Howard, T. M. Inglis, J. Ewing Johnston, T. McGuinness, F. G. Samson, P. J. Simpson, and W. Jackson Young.

3. *Correspondence.* (a) A letter was received from the Secretary of the Western Counties V.M.A.,

announcing that Mr. R. B. Nelder was nominated to represent the Association on the Council of the Fund, in place of the late Secretary, Mr. W. P. Stableforth.

(b) Letters were submitted calling attention to the facilities available at the Crossley and Porter Orphan Home and School, Halifax, and the Royal Infant Orphanage, Wanstead, E.11.

4. *Secretary's Report.* The Secretary reported that since the previous quarterly Meeting the following subscriptions from new members had been received:

	Subscription. £ s. d.	*Donation.* £ s. d.
A. S. Adams	1 1 0	
J. H. Dale	10 6	
Per Mr. E. Alfred West, Hon. Treasurer:		
B. S. Cockerton	1 1 0	
W. G. Blackwell	10 6	
L. G. Gryspeerdt	10 6	
Anonymous		5 0
J. Bell	10 6	
Miss M. G. Price	10 6	
R. Bryden	10 6	
Hobday, Sutton and Stainton...	2 2 0	
J. Woodger and Broad ...	1 1 0	
W. Blunson		10 0
J. H. Crawford	2 10 0	
A. Cornish-Bowden	10 6	
L. S. Balls	10 6	
E. T. Stanley	10 6	
V. Pride-Jones	10 6	
Bolton's Cinema		33 12 0
G. W. Dunkin	1 1 0	
W. N. Thompson	10 6	
F. W. Cox	10 6	
A. C. Wild	10 6	
For Special Purposes.		
Sir J. M'Fadyean	5 0 0	
W. D. Rees	2 0 0	
Anonymous	1 0 0	
	£8 0 0	

Donations.	
Midland Counties V.M.A.	5 0 0
Central V.S. Collecting Box	2 16 10
F. L. Gooch	9 6
Southern Counties V.M.A.	11 3
Mrs. Crowhurst	5 0
	£9 2 7

5. *Cases.* No. 31, Mrs. G., 76, widow, two sons, two daughters. Grant discontinued. An appeal was received for the re-consideration of the decision to discontinue this grant, but it was resolved that no action be taken.

No. 47, Mr. H. S., M.R.C.V.S., 63. Ill-health, no employment. Receives grant of 15s. weekly. A report on this case was received, and it was resolved that the grant be continued for the present.

No. 57, Miss E. M., 44, daughter of deceased member. Ill-health prevents continuous occupation. Grant of 10s. weekly. A report was received on this case, and it was resolved that the grant be continued for the present.

No. 81, Mr. M., 36, son of deceased member. Unemployed. The Executive Committee reported that they had held a Special Meeting to consider this case, and under very distressing circumstances

(*Continued at foot of next column.*)

DIVISIONAL REPORTS.

Mid-West and South Wales Division.

MEETING AT BATH.

The presentation of a series of clinical cases by various members served admirably to maintain the high level of interest set by previous meetings on the occasion of the visit to Bath for the Spring meeting of this Division, which was made on April 17th, 1925. A good assembly of members at the Red House Restaurant, New Bond Street, was presided over by the President, Mr. A. E. Roberts. There were also present Messrs. Adams, Armstrong, Bovett, Coleman, Delacherois, Henson, Hewer, Hobbs, Masheter, Moore, C. E. Perry, Powell, Rees, Sayer, Stevens, Tonar, Turner, Veitch, Watson, and Aveston (Hon. Secretary).

The minutes of the previous quarterly meeting, which had been published in the *Record*, were taken as read and were confirmed and signed.

An apology for absence was announced from Mr. Scott.

At the request of the "National," the meeting considered the resolution (which had been placed before the Council of that body) standing in the name of Sir John Moore regarding the establishment in Great Britain of a Veterinary Research Council.

The PRESIDENT remarked that they had heard the resolution read, and had, doubtless, seen the correspondence which had appeared in the *Record* in regard to it. The matter was open for discussion.

Mr. MOORE proposed the adoption of the resolution. He regarded the object in view as a most worthy one, and he did not think that there was a great deal that one could add to what had already appeared in the *Record* on the subject. It was obvious that Sir John Moore had gone into the subject very thoroughly.

Mr. COLEMAN, in seconding, said that he had been present at two or three meetings at which Sir John

(*Continued from previous column.*)

had made an additional grant of £5. They could not, however, recommend any further grant. It was resolved that the action of the Executive Committee be approved.

No. 89, Mrs. P., 50, widow, two children aged 14 and 12 at school. No relations able to help. No income. Children left unprovided for. It was resolved that a grant of £1 per week be made in this case.

6. *Investment of Donations.* The Treasurer reported that, as authorised, he had invested the sum of £411 14s. from donations in the purchase of £500 L. M. and S. Railway 4 per cent. Preference Stock, 1923.

7. *Annual Report.* A draft of the Annual Report was submitted and considered, and it was resolved that the Annual Report be approved and ordered to be issued to the members of the Fund prior to the Annual General Meeting.

Moore had been present to speak on his resolution, and he (Mr. Coleman) was sorry that Sir John was not there that afternoon, for if he had been, he was sure they would have no hesitation in supporting it whole heartedly. He thought it was a step in the right direction of getting the profession recognised by government departments. The Central and the Royal Counties' Divisions had adopted the principle of the resolution, and had expressed themselves strongly in its support, and he hoped they would do the same.

Mr. SAYER supported the principle underlying the resolution but expressed the opinion that a veterinarian of practical experience should take the place of one of the three medical scientists suggested. He moved an amendment to that effect. All the best discoveries standing to the credit of the veterinary profession had been made by practical men.

Mr. COLEMAN pointed out that the point raised by Mr. Sayer was already (in his opinion) met by the suggested appointment of five veterinary scientists, amongst whom there was no reason to believe that the practical veterinarian would not be represented. He was afraid that if they began side-tracking they would be complicating the issue to such a degree that there would be little prospect of the proposal being carried through. He thought the Division should adopt the proposal as nearly as possible in uniformity with what was recommended.

Mr. STEVENS seconded the amendment, which was put to the meeting and lost, when the resolution was put and carried by an overwhelming majority.

The Secretary read correspondence from the Secretary to the Council of Agriculture for Wales regarding the following resolution, which was recently sent to the Council of the University of Wales by a Welsh County Council to be considered by them, and concerning which the Association's views were desired: "That in the opinion of this Council the time has arrived when the University of Wales should give consideration to the importance of providing facilities in the Principality for the fuller training of students in Veterinary Medicine, and that a copy of the resolution be sent to the University Council."

The Secretary said that he had invited the attendance of the Secretary of the Council of Agriculture for Wales, but that gentleman had been unable to accept.

The PRESIDENT: Do they mean by that that a full veterinary course should be given to enable students to pass the examinations of the R.C.V.S. ?

The SECRETARY: Yes, a full course is evidently in their minds.

Mr. COLEMAN: I am afraid I cannot support the suggestion that the University of Wales should start a Veterinary School. I would like to point out that the Royal Veterinary College in London has now, at very great expense to the country, obtained a veterinary laboratory of importance, and that Edinburgh has done the same, while there is a talk of doing away with the college at Glasgow, on the grounds that they could not have these laboratories at so many different schools. It cannot, therefore, be a wise thing for the Welsh University to go to the expense of having a huge laboratory for the teaching of their students. I would suggest that a polite letter be written to say that for the small number of students now presenting themselves to qualify for the veterinary profession the schools at present in existence were more than adequate.

The SECRETARY: The great stand-by to-day is the general practitioner. These central research stations cannot go on without the field and spade work. I feel that we must not only look at the question from the research standpoint, and even from the practitioner's standpoint, I think Wales is fairly well provided for.

Upon the motion of Mr. COLEMAN the meeting unanimously adopted the following resolution:

"That, in the opinion of the Mid-West and South Wales Veterinary Association, the veterinary schools already in existence, and which are expensively and fully equipped for the teaching of veterinary science, are more than adequate to meet the demands which are likely to be made upon them."

INTERESTING EXHIBITS AND CASES.

The PRESIDENT: I am very pleased to see that there are a number of gentlemen here who have agreed to bring forward interesting cases. After each speaker has presented his case it will be open for discussion.

Mr. HEWER, who was called upon by the President to present his cases first, said: A little while ago I had a Great Dane brought into the surgery which, though it was not a ferocious dog, was an enormous size. Consequently the owner sent this muzzle (produced) with it. At the time I had in a dog which was rather fond of using its tongue, and it struck me that here was a good subject on which to try it. I did so, with excellent results. The dog wearing this muzzle cannot make a sound, and he cannot scratch or tear it off. It will fit any dog from a terrier to a Great Dane.

My first case is that of a hunter, aged 9 years. She is a bay mare standing 15.3 hands high, and had been purchased by the owner the season before this. Last season she hunted well. This season she has been going fairly well, but the owner reports that she has been refusing her jumps several times. Two or three times since Christmas she has had hæmorrhage from the bladder. On one occasion, two or three months ago, when I saw her she had passed a lot of blood.

I put her on to the ordinary tonics and she responded. She was in good hunting condition, and the owner asked me if I thought the animal would be fit to continue. I did not advise it, and a week ago I got a letter from the owner saying that the horse had been hunted and had lost her condition, but that all her organs were functioning well. I went and found the mare dropped in the belly, and with her quarters dropped and presenting the appearance of

having a foal in her. She looked as if she was ready to foal, except that she had no udder. The owner then told me that the mare had been out to grass with another horse and that possibly there was a colt there. Two days later I examined her *per rectum*. I could not touch a foal, but in the position of the sacral joint I could feel a large tumour, about as big as a man's head. I reported to the owner accordingly, and received instructions to have the mare destroyed. I made a *post-mortem* last night and found her abdomen full of fluid and what, had she been a cow, one would have said were tuberculous masses.

The tumour weighed approximately 1½ cwt. I cut them out and took this photograph (reproduced above). Both kidneys were enlarged, as was the liver, but the bowels were considerably reduced in size, and it was extraordinarily difficult to find some of the other organs. In the pail here is a portion of the growth, as to the real nature of which I am undecided. There was no sign of tuberculosis, as the glands were normal.

The PRESIDENT: It looks rather like a sarcoma to the naked eye.

Mr. HEWER: I think so. The extraordinary thing is that she was hunting within a week ago. Within the last week she has eaten practically nothing. All the trouble was apparently in the abdominal cavity—forward of the diaphragm everything appeared normal.

My second case is also one of debility. A seven-year-old cart horse was reported to me a fortnight ago as going off his food, and I was requested to examine his teeth. I did so, and gave a tonic, but there was no improvement. I saw him a week later, when I was in a quandary as to what was really the matter. His temperature was 102°F., his pulse rather weak, and he was rather weak in his walk. His coat was fairly glossy. The horse would not eat for more than ten minutes together when at grass. He dropped dead yesterday, and *post-mortem* revealed the lungs to contain numerous small abscesses on the surface. There was cirrhosis of the liver and there was an abscess in the hilus of the left kidney. There was no sign of tuberculosis. The anterior lobes of the lung were consolidated. The abscesses varied in size from that of a thumb nail to that of half-a-crown.

The next case was of a cow which I was sent for to see, with the message that she was lame—hanging her leg,—as she had slipped up. I arrived and found her with her hock doubled up, tight to her body. She would only move the leg a little, and I suspected a dislocation of the stifle. I could extend the hock slightly. I put the ordinary ropes round the body and pulled her down. In doing so I reduced the dislocation, and after release the cow got up and walked away. With the exception of slight lameness she has completely recovered. She had not got the typical symptoms of stifle joint dislocation, *i.e.*, there was no dragging of the leg behind. I wondered if any member had met with anything of the same sort that would assist one in forming an opinion as to what injury had really been sustained by the cow.

Mr. SAYER: Were the muscles badly contracted above the hock?

Mr. HEWER: No, apparently there was nothing the matter except that the leg was being carried in the position I described and was set there.

The PRESIDENT: I had a similar case to that some years ago, but it kept recurring. It was not in the stifle, but it was a partial dislocation of the femoro-tibial joint. The only way to put that back was to roll the cow over, when the joint would go back to normal.

Mr. HEWER: The tibia and femur were absolutely in line in this case, which was of the nature of an exaggerated form of stringhalt, only the limb was held there.

Mr. COLEMAN: Referring to Mr. Hewer's first case, the growths appear to me to be like lipomata. Could he inform us whether any of the bowels were discoloured, or whether they were darkened at all, as though strangulation had taken place? I have seen a similar thing in oxen, where a large lipoma has formed and the bowel has become strangulated, and that has caused death.

In the second case, was there any prior history: had the horse been suffering from strangles, for instance? Mr. Hewer's third case was very interesting. I have seen a similar condition where the ligamentum teres has become elongated, and the head of the femur has come out of the acetabular cavity. I am, from the symptoms given, rather of the opinion that it was the acetabular cavity that was affected, because, if it was the stifle, I cannot see how the leg could have been flexed at all. In the first case, did Mr. Hewer examine for any strongyles? I had a filly that used to show colicky pains. Ultimately we killed her, and I found just near the right kidney an enormous growth, as big as a peck measure. Previous to that I found three varieties of strongyle, which get into the blood stream. They were the cause of all the trouble, and we found them adherent to the small colon. Some were as long as 1¾in. I should like to know if Mr. Hewer looked for them, as the growths in his case may possibly be parasitic in origin, though this certainly appears to me to be more of a lipomatic condition. The muzzle he exhibited I saw thirty years ago. (Laughter.)

The PRESIDENT: I am sure we are all very grateful to Mr. Hewer for bringing these interesting cases forward. I will call upon Mr. Sayer.

Mr. SAYER: The case which I desire to relate is, I fear, of very ancient date, but inasmuch as poisoning cases have been to the fore recently, I trust it may be of some topical interest. The case is one of poisoning by nitrate of soda.

A veterinary practitioner, who also kept a livery stable, called me in many years go to see a number of his horses which were bad. On the previous day he had had a truck of new hay. This hay, with which the horses were racked up, was clover hay, good quality, but badly weather exposed. The animals went out to work in the morning apparently all right. About 3 o'clock one arrived home badly griped, and by the evening he had six more griped. The symptoms were those of acute enteritis, and five of the horses died. A *post-mortem* was made, and all the signs of acute enteritis were observed. The owner had spared a load of this hay to another livery stable keeper, and he told the latter what had happened in connection with it. As a consequence, the second man did not make use of it for three months. He then thought he would use it in the proportion of 1 to 5 trusses as chaffing. The following evening I was called in to attend seven of his horses with gripes. The symptoms were acute enteritis, while there proved to be a good deal of adhesion of the peritoneum. We tried to find the cause and the history was that this hay came from a little farm in Pembroke, and one of the experts down there had advised the farmer to dress it with sodium. He used nitrate of soda—possibly mistaking it for sodium chloride. He (Mr. Sayer) had never had a case of poisoning with Na. nit. since, but it struck him what an irritant substance it must be to have proved toxic in such small quantities as each of those horses must have eaten. Na. nit. was found in solution in the hay.

In reply to a question, Mr. Sayer said that the place of the occurrence was not in the neighbourhood of any smelting works, and there was, therefore, no possibility of either arsenic or lead being incriminated. He had never heard of any recorded cases of the poisonous effect of Na. nit.

The PRESIDENT: There were no diagnostic symptoms at all?

Mr. SAYER: The colic was apparently of the ordinary type, and the only unusual feature was the exceptional exhaustion shown by the affected animals. There was no excess of urination.

Mr. STEVENS suggested that there might have been a chemical reaction between the hay and the Na. nit. He thought it was possible that there might have been a great deal of impurity in the Na. nit., possibly iodine, which was an irritant poison.

Replying to a member, Mr. SAYER informed the meeting that his treatment was on the usual lines adopted in those days, *viz.*, the administration of opiates.

Mr. PERRY: I had a case which occurred in my practice recently which, I think, may be of interest to the members, *i.e.*, the surgical treatment of eversion of the womb in cattle. I have often put back the womb in the ordinary way. The other day I was called to a case and when I got there I found it was an ordinary case of eversion; it occurred exactly a week after calving. I tried to replace it, but could not do so, and I thought the only thing to do was to sling the cow by the hocks and replace it that way. We were about to do this when she started to kick, with the result that a foot went through the womb. I advised the owner to destroy her, but the owner asked me to take the womb away. I had some very strong tape, and I made a clove hitch round the base of the womb close up to the tail. That did not stop the hæmorrhage, so I put on another, but it broke. I next secured some binder twine, disinfected it, and took a clove hitch round the base of the womb.

I put a seton needle through and tied double. Then I took the womb off and put back the stump. I thought the cow would die, but she made a complete recovery. She is doing her calf well, and the cow is quite all right-to-day. Previous to this I had always destroyed the cow when unable to return the womb. I had never tried to do the operation before, but it is one I now think should always be tried before destroying the animal.

Twelve months ago I was in the north of England with Mr. Hudson, who so successfully performed operations at a recent "National" meeting, and he took me out to a case saying he was going to open up a blind teat. He had a cow with three blind teats out of the four. He used what he called a cork-screw dilator, and with it he dilated the teats, with the immediate result that the milk came. I have one of Hudson's cork-screw dilators here (produced). It is inserted and twisted round in position, with the result that the membrane across the base of the teat is broken down: you unscrew, and the teat is free. I brought an instrument home and since then I have operated on thirty-five cows, and in nearly every case I have been successful. Messrs. Roberts, Scott and Watson have all used it successfully. I do not say you can open every blind teat with it where, for instance, there is a growth, but where there is a membrane across the top of the teat it is very successful. No bougies are required to be used afterwards. Mr. Hudson is now patenting his instrument, and it will be on the market very soon.

The PRESIDENT: I borrowed the instrument from Mr. Perry last week, and on Tuesday I operated on two cases. I was astonished at the strength one has to exert to break down these thick membranes. I had an immediate result. On Wednesday I had a message to say that the owner had been able to get the milk down quite well until an hour previous. I asked him to massage the teat, as the stoppage might be due to a clot of blood. He did so, and it was quite successful. The other case was a fibrous growth halfway down the teat—the sort of case for which Mr. Perry does not quite favour the use of this

instrument, I believe,—but here again its use was quite satisfactory.

Mr. POWELL: These cows are usually very fractious —what methods of restraint are used ?

Mr. PERRY: Mr. Hudson has a patent strap which goes round above the hock in the ordinary way. It is very strong, and the cow cannot do anything.

Mr. COLEMAN: I wish to thank Mr. Perry personally very much for his interesting case of removal of the uterus. I have done twenty cases in the last two years in pigs and cows, and most of them have got on well. Mr. Perry has said something about difficulty in arresting the hæmorrhage. I take a long needle and some hempen twine about whipcord size. With the needle I pass the twine through double; then, taking each end round, I tie half of it on either side. I then simply cut off the womb with an amputation knife about half an inch from the twine. Thoroughly disinfect the stump with a solution of chinosol, and you will have little to fear. I am glad to have Mr. Perry's confirmation of my view of the practicability of this operation. The cork-screw instrument is very interesting indeed—I have had many successes with the ordinary methods when the obstruction has been at the base of the teat.

Mr. STEVENS received a negative reply from Mr. Perry to a question as to whether or no he had seen any bowel in conducting his operation of amputation of the uterus, in connection with which the text-books warned operators against the possibility of including a piece of bowel. He himself had seen none.

Mr. PERRY, referring to the use of the cork-screw teat dilator, said it was quite possible by its use to remove a small obstruction in the teat.

The PRESIDENT expressed the opinion that it would be an advantage if the stem of the instrument were a little longer. He then called upon Mr. Watson.

Mr. WATSON: I would like first to make reference to Mr. Perry's instrument. He did a case for me very successfully, and I tried to get an instrument made like it, but it was not the right shape. I went to do a cow, a very big roan Shorthorn, and when I began to withdraw the instrument from the teat she jumped up, and the instrument came out pulling the lining of the teat with it.

I wish to pick the brains of the members here as much as possible, and have selected my cases with that object. My first case is one of broken neck. A hunter 7 years old, carrying a farmer, hit a fence and fell on his head. The horse staggered a little after getting up, but appeared sufficiently recovered for the farmer to remount, which he did and rode ¾ mile, when he got off and walked. The horse walked 1½ miles home before it collapsed. We tried to treat him, but he died in 48 hours. *Post-mortem* showed that the atlas was split longitudinally down the canal, and was, in all, found to be in five pieces. Is there any means by which you could have diagnosed that ?

The next case was a 5 month's old spaniel puppy, reported off his food and in pain when touched. The dog carried his neck and thorax very rigidly. He seemed happy, but when you picked him up he howled tremendously. I suspected pachymeningitis. The animal lived for three days, and on *post-mortem* the head of a mutton chop was discovered in the thorax.

The next concerns a fourth-calf cow. Last Saturday morning the farmer noticed she could not get up, and she calved in the evening. He sent for me, saying that the cow had milk fever. She was certainly very drowsy, but there was a great deal of tympany between the bowel and the belly wall, which I took to be indicative of peritonitis. I treated her for milk fever, and gave her a dose of physic and left some ammon. carb. On the following day she was just the same, except that she had developed gangrenous mammitis in one quarter. She lived for two more days. Was that mammitis, milk fever, or peritonitis ?

Mr. REES instanced a case in which a horse worked for 48 hours after sustaining an injury which, on *post-mortem*, revealed itself to be a multiple fracture of the atlas. four fissures running right through the canal.

Mr. SAYER gave another case in which fracture occurred between the second and third vertebræ of a tramway horse. There was only a little swelling observable in the neck, but partial paralysis set in on the seventh day.

Mr. HOBBS detailed a case in which, when throwing a horse for firing some years ago, a crack was heard. The firing completed, the horse got up and walked 150 yards to the stable so soundly that nothing was thought to be wrong after all. The animal was tied up after blistering, to the rack, and the man watching her went to sleep. At two o'clock in the morning, the man was wakened by the thud of the horse falling down. On *post-mortem* an extensive fracture in the lumbar region was discovered. He admitted that, if the horse had become paralysed, the falling down might have made the fracture worse than it had originally been.

Mr. COLEMAN began to demonstrate with Mr. Aveston an arrangement for spanning a cow which Mr. Hewer terminated abruptly by remarking, amid laughter and assent, that its use was no doubt common knowledge thirty years ago.

The President then requested Mr. Hall Masheter to present his contribution to the case list.

Mr. MASHETER: Having been asked partly to fill the gap for this meeting, I thought perhaps a more or less casual talk and statement of my experience of the treatment of "Contagious Abortion in Bovines," by means of injections of dead cultures might be of interest.

It was in the year 1910 that I first took an interest in this disease.

A small herd of eleven pure-bred Lincoln Shorthorn heifers all aborted. I gave them a series of three injections of dead cultures of Bang's Bacillus in increasing doses at weekly intervals. They all carried full term calves the next year, and no further abortions occurred. This was in Norfolk, which is not a dairy county.

During the last seven years in Gloucestershire I have at intervals treated several herds with the following results:

In 1918 a herd of 46 cattle—one or two aborted whilst being treated, but no further trouble.
In 1919 a herd of 12 cattle ... No abortion since.
In 1921 a herd of 18 cattle ... „ „
In 1922 a herd of 8 cattle ... „ „
In 1923 a herd of 9 cattle ... „ „
In 1924 a herd of 20 cattle ... „ „

This last herd was very interesting. The herd consisted of twenty well bred dairy shorthorns, and there were six or seven aborts before treatment. Some time afterwards the owner reported that he was disappointed with the treatment for although abortion had stopped there were four cows which he could not get in calf.

I examined these but could find no abnormalities of ovaries, etc., so I suggested an extra injection of the No. 3. I re-injected these, and I am pleased to say that they have all now calved normally, or are shortly coming down to calve.

I had a letter from this client on Saturday last asking me to vaccinate some more young stock before putting them into the herd.

On the other hand, a client of mine last year consulted me as he had several cows abort. I advised him as to treatment, but evidently the cost was too much for him, or else he was over persuaded for the next I heard about it was, that someone else had treated his herd with live bacilli at one-third the cost.

Some months later he asked me to attend a cow in parturition. I did so, and took away twin calves at five months. On further inquiry I elicited the fact that sixteen cows had been treated. Twelve of these were sterile and he was feeding them off, and the thirteenth cow from which I took the twin calves aborted at five months.

Replying to the President, Mr. Masheter said that he used Messrs. Burroughs, Wellcome's product, injecting 100 million organisms as a first dose, 150 millions as a second and 500 millions as the third.

The PRESIDENT: It seems to me that a great advantage of Mr. Masheter's treatment is that you need not worry as to whether it is contagious abortion or not—it is using a dead culture.

Mr. ADAMS: I should like to ask Mr. Masheter if he could give us the exact number he has done during the period without any abortions.

Mr. MASHETER: I think it is 123.

Mr. COLEMAN asked if any members present had had the blood of the bull subjected to the agglutination test. He was asked to have it done, and a positive re-action was obtained. It was not a contagious abortion herd. At the Royal Counties meeting the question of sterility following abortion was very fully discussed, but he did not get any satisfactory idea on this point. He thought that a lot of cows which had aborted and had been vaccinated with the Ministry of Agriculture's vaccine had been absolutely sterile.

Mr. MASHETER, in answer to a question, said that if dead bacilli were being used the bull should be injected at the same time as the rest of the herd, but not if live bacilli were employed.

Mr. POWELL: On my way here this morning I went to see a cow which was supposed to be snoring a little. In these cases I make it a general rule to examine the pharynx. I had a gag with me, and I extracted this piece of twisted wire (produced) from the pharynx.

The PRESIDENT: I desire to refer briefly to cases of lead poisoning, because we have recently reported in the *Record* a case in which an eminent authority has denied the possibility of the occurrence of acute lead poisoning. I had a number of cases a few years ago which I mentioned at a meeting at Chepstow. In these we had symptoms comprising delirium; the animal trying to climb the wall; grinding of the teeth; padded mucous membranes; constipation, but with occasional passage of very dark fæces; marked rigors and stinking breath. We found that the cows had been getting at white lead in a tub. There were hundreds of little pellets of lead in the rumen, in the centre of which was also a friable white mass. I am rather astonished that this eminent authority should deny the existence of acute lead poisoning.

A hearty vote of thanks was accorded those gentlemen who had contributed cases for the consideration of the meeting.

Next Meeting. At the invitation of Mr. Hobbs and Mr. Robinson, it was decided to hold the next meeting (on the third Friday in July) at Newport, when a char-a-banc run through the Wye Valley would be undertaken. Ladies to be invited. Business will be transacted during the tea interval, and Professor Buxton has kindly promised to give a demonstration of the intra-dermal test for tuberculosis.

The meeting concluded with a vote of thanks to the President for his conduct in the chair.

The members subsequently enjoyed a substantial tea together.

J. J. AVESTON,
Hon. Secretary.

At a meeting of the Canadian Society of Anæsthetists at Toronto, it was announced by Dr. F. H. McMechan, the executive officer of the Research Bureau of the Association of Anæsthetists of the United States, that through a discovery made two weeks ago, the last obstacle in the way of the general use of ethylene as an anæsthetic had been removed.

The discovery of the process by which ethylene has been made safe is attributed to Dr. James H. Cotton, of Toronto, and the result has met with the approbation of the medical profession. The chief danger in its use in the operating room was said to come from its explosive nature. Lately through the work of the Research Bureau it has been proved that the presence of 35 per cent. of water vapour in the air acted as a complete preventive of these explosions.

North Wales Division.

A meeting of the above Division was held at the Cartmel Hotel, Colwyn Bay, on Tuesday, February 24, at 2 p.m.

Present.—Major Oliver, Messrs. Richard Jones, Mauley, Cave, Salisbury, Booth, Lloyd Jones, Montgomerie, Jones-Roberts, Mathews, Savage, W. O. Jones, H. V. Hughes and J. H. Wynne (Hon. Secretary).

Apologies were received from the President, Mr. Edwards, Mold, Messrs. Trevor Williams, Wynne Lloyd, Cartwright, Llewelyn-Jones and Smyth. The President had written regretting his inability to be present owing to ill health, and the Secretary was instructed to write to him expressing regret that he was unable to attend, and that all present sincerely hoped he would soon be restored to health.

Major Oliver was elected to the chair. The minutes of the last meeting were taken as read.

The Secretary read a letter he had received from the Secretary of the North Wales Branch of the British Medical Association, stating that, owing to great pressure of business, it would be impossible to hold the adjourned Joint Meeting of the two professions in January s was intended. The reading of this letter lead to a very interesting discussion on Clean Milk, and it was agreed to give the Clean Milk Campaign every possible support.

Mr. MATHEWS said that the veterinarian should be closely associated with the work, and it was suggested that other societies interested in Clean Milk should know that the Veterinary Profession is anxious to help.

A letter from Mr. Roberts, Pwllheli, was read suggesting that at a future meeting it would be very interesting to have a demonstration upon cows affected with sterility. Several members spoke in favour, and it was agreed that the Secretary should arrange this, with the assistance of Messrs. Mathews, Montgomerie, Roberts and Savage for the next meeting to be held at Bangor about the end of July.

All the officers were re-elected on the proposition of Mr. BOOTH, seconded by Mr. JONES-ROBERTS.

A discussion on liver fluke followed, nearly all present taking part in it.

It was generally agreed that liquid extract of male fern, in doses recommended by Mr. Montgomerie in the circular which he had issued to the members, was an effective remedy and that treatment could be carried out at a price that was economically attractive to sheep owners.

New Meat Regulations.—It was resolved "that on account of their training in pathology and bacteriology, and their experience of diseases of animals, Veterinary Surgeons are the most suitable persons to carry out the inspection of meat."

J. H. WYNNE,
Hon. Secretary.

Dr. O. Charnock Bradley, Principal, Royal (Dick) Veterinary College, Edinburgh, has been selected by the Scottish Board of Health as a member of their Consultative Council on Local Health Administration and General Health questions.

Veterinary Medical Association of Ireland.

ANNUAL GENERAL MEETING.

(Concluded).

REPORT OF DEPUTATION TO THE MINISTER FOR LOCAL GOVERNMENT AND PUBLIC HEALTH.

On Friday, January 23rd, 1925, at 11 a.m., a deputation from the Veterinary Medical Association of Ireland, composed of Senator J. J. Parkinson, Messrs. P. J. Howard, J. J. Kelly, J. J. O'Brien (Claremorris), and Professors Craig and O'Connor, waited upon the Minister for Local Government and Public Health (Mr. Burke).

The Hon. Secretary (Professor O'Connor) made the following statement :—

Sir,—In introducing the subject of our deputation we wish to say that our Association had drawn up a scheme for a unified Veterinary Service to carry out the duties under the Public Health Acts and under the Contagious Diseases of Animals Acts in every rural district in Ireland, which was presented to the Minister for Agriculture, who approved of it and expressed the probability of being able to arrange with the Minister for Local Government and Public Health to have it, or a similar measure, carried into effect. Moreover, our Secretary had an interview with Mr. Meyrick and Mr. Walsh, representing the Department of Agriculture, and Mr. Smith, representing the Local Government Board, at which it was decided to ascertain what funds would be available from both Departments for the purpose of appointing whole-time veterinary officers throughout the country to do the combined work under the two Acts, and to inform the Veterinary Medical Association of the result of the enquiry before making any appointments. In all correspondence which the Association had with the Ministry of Local Government *re* the appointment of veterinary surgeons to positions under the Dairies, Cowsheds and Milkshops Order, and for the inspection of meat, the Ministry assured them that only veterinary surgeons would be sanctioned for these positions. Consequently the Association did not think it necessary to make early representations to the Local Government Board for the purpose of ensuring that provision would be made in the new Local Government Bill for the employment of veterinary services under the Public Health Acts. But eventually, considering the great importance of the matter from the point of view of Public Health, they decided that it would be well to approach you, Sir, before the Bill finally became law, to make sure that the measure would provide for the veterinary inspection of dairy cows, and of meat and of animals intended for slaughter for the supply of meat, and also to claim representation of the veterinary profession on the staff of the Local Government Board and on Consultative Public Health Councils, to insist on the veterinary services being carried out. We consider the whole question of such importance that the present Bill should be amended so as specifically to state that the veterinary inspection of dairy cows, and of meat, would be insisted upon. We also respectfully claim that where existing veterinary officers under the Public Health Acts are deprived of office under the new Bill, they shall receive compensation on the same basis as other Public Health officers on loss of office.

With regard to the question of the most efficient scheme of veterinary Public Health services compatible with economy, we consider that the scheme we have already drawn up, providing for whole-time officers for cities and for the division of the country into suitable districts with a part-time veterinary inspector resident in each district, appointed to carry out the duties under both the Public Health Acts and the Contagious Diseases of Animals Acts in his own district, would be the most efficient, most practical, and most economical method of dealing with both services, because it is only by such an arrangement as this that it would be possible to overcome all the work and give it prompt attention without imposing great

expense on the country. One penny in the pound rate would be sufficient for the purpose.

The unification of the Services would prevent expensive overlapping as, for example, in connection with bovine tuberculosis, which is dealt with under the Contagious Diseases of Animals Acts and under the Dairies, Cowsheds, and Milkshops Order. On the question of remuneration, this would vary according to the district, say £200 to £250 in a populous district, and £350 in a remote district.

The following points were discussed :—

1. *The question of whole-time appointments under the Public Health Acts.*—The Minister remarked that it was their experience that the duties were very inefficiently carried out by part-time officials, presumably because their official duties clashed with their practical work, inasmuch as that they refrained from prosecuting their clients for infringements under the Acts.

The deputation replied that the causes of the inefficiency of the part-time veterinary inspectors up to the present were (*a*) the inadequacy of the remuneration, on account of which proper attention could not be given to the work ; (*b*) the lack of sympathy and support from the local authorities, who were rather hostile to the carrying out of the Orders under the Public Health Acts in many places ; (*c*) the want of supervision by a supervising veterinary inspector.

It was pointed out to the Minister that it would be utterly impossible for one whole-time veterinary inspector to efficiently inspect dairy cows and meat throughout a whole county. Mr. O'Brien said that at least six veterinary inspectors would be required for County Mayo.

Mr. Howard said that he had carried out the duties under the Dairies and Cowsheds Order without any remuneration or encouragement from local bodies.

2. *The cost of veterinary inspection under the Public Health Acts.*—Mr. Howard said that a rate of one penny in the pound would be sufficient to appoint the requisite number of part-time veterinary inspectors for both the Public Health Acts and the Contagious Diseases of Animals Acts, allowing salaries varying from £250 to £350 per annum, according to the nature of the district.

3. *Supervision of Veterinary Inspectors.*—The deputation explained that about three supervising veterinary officers would be sufficient to ensure that all the veterinary inspectors performed their duties satisfactorily.

4. *Amendment of the Local Government Bill so as to have it specifically stated that Veterinary Inspectors would be appointed under the Public Health Acts.*—The Minister's advisers said there would be no necessity for this, as veterinary surgeons were always appointed under the Dairies, Cowsheds and Milkshops Order and as meat inspectors, and that laymen were never sanctioned for these appointments by the Local Government Board. They said the Orders provided for their appointment, but the deputation insisted that as the law stood at present, it was at the discretion of the Minister who happens to be in office whether veterinary surgeons or laymen were appointed, and they wanted to bind the Minister to make veterinary appointments. Mr. Burke agreed with this argument and said it would be better to have the Bill amended as desired, and forthwith arranged to have this following amendment added to the Bill.

Section No. 20.—Immediately before Section 20 to insert a new section as follows :—

Veterinary Inspectors.—20. (1) Every sanitary authority shall appoint, with the approval of the Minister for their sanitary district, one or more persons registered under the Veterinary Surgeons' Act, 1881, to be veterinary inspectors for such district.

(2) Every veterinary inspector shall be a sanitary officer within the meaning of Section II. of the Public Health (Ireland) Act, 1878.

(3) This section shall not come into effect until the appointed day.

5. *Representation on the Central Staff of the Local Government Board.*—The deputation claimed representation on the Central Staff of the Local Government Board to ensure that the veterinary Public Health services would be efficiently discharged. The Minister said, as the Medical Officer of Health was responsible for the Public Health Section under the Bill, it would be rather out of place and unnecessary to have a veterinary surgeon in practically the same position. The deputation did not press the point.

6. *Representation on the Consultative Councils.*—On this question being raised the Minister said these were not fixed bodies, but were only formed in cases of emergency and would be constituted according to the nature of the advice required. If veterinary matters were concerned they would naturally seek the best veterinary adviser procurable for the purpose.

7. *Compensation to Veterinary Inspectors on removal from office.*—The deputation claimed for veterinary inspectors who might be dismissed from office under the present Act, compensation on the same basis as other Public Health officers on removal from office. The Minister said the provision in the Bill for compensation in this respect only applied to whole-time officers and veterinary surgeons did not come under this category.

8. *Inspection of Bacon Factories.*—The deputation spoke of the necessity of this in connection with the export of bacon and said it was being neglected up to the present. The Minister appreciated its importance.

The Minister gave the deputation a very patient and friendly hearing and seemed convinced by the arguments put before him.

Mr. Parkinson thanked the Minister (Mr. Burke) on behalf of the Veterinary Medical Association of Ireland for having received the deputation, which then withdrew.

Mr. Parkinson afterwards took a copy of the amendment to have it at once inserted in the amended edition of the Bill.

* * * *

The report, published in the *Clonmel Chronicle*, of the meeting of the Munster Veterinary Inspectors' Association, to which reference is made above, was as follows :—

"A meeting of the Munster Veterinary Inspectors' Association was held in Cork recently. There were present : Messrs. T. Mulcahy (who was in the chair) ; W. Power, J. Preston, M. J. Mitchell, J. J. Walsh, D. M. Barry, J. J. Condon, P. J. Walsh, E. McSwiney, C. O'Driscoll, W. J. O'Donoghue, J. F. Healy, C. P. Hynes, A. F. Callanan, F. O'Leary, D. Brophy, T. J. Clanchy, P. W. Creagh (hon. treasurer) ; T. I. Alexander (hon. secretary).

"The deputation which had waited on Mr. P. Hogan, Minister of Agriculture, on the 5th December, 1924, gave an account of their interview. Various members expressed their satisfaction at the patient hearing which their deputation had received.

"A discussion then took place on the proposed new scheme of veterinary inspection, which contemplates the dismissal of part-time veterinary inspectors throughout the Irish Free State, and their replacement by county inspectors.

"During the discussion which took place, Mr. Mulcahy (chairman) said that nobody could deny that through scientific methods the veterinary profession had saved hundreds of thousands of pounds to the farmers of the country, and consequently to the State, by the prevention and successful treatment of disease amongst live-stock. It was well that the public should know that only twenty per cent. of the veterinary surgeons in the Free State were able to live by practice alone and held no appointments which were in the nature of subsidies. This twenty per cent., had, in the majority of cases, private means. If the proposed scheme were put into force he could assert, without fear of successful contradiction, that it would mean that the greater part of the other eighty per cent. would have to leave the country or abandon practice, as the motor industry had cut off the great source of income resulting from the breeding of horses. The consequence of putting the proposed scheme in operation would be that the farmers would have to do without veterinary assistance, or to send much greater distances for it, with resultant additional

expense. If qualified men had to leave the country or abandon practice, it would drive the agricultural community back to the methods of forty years ago, when the quack and empiric were employed with disastrous results.

"Mr. Preston said as one of the oldest inspectors present, his experience had been that the present system of part-time veterinary inspection had given most excellent results in the past, and the contemplation of any measure which would leave large tracts of the Irish Free State without any resident veterinary surgeon suggested that it would be a most grevious mistake against Irish agriculture—our only and most vital industry.

"Messrs. Hynes, O'Leary, Clanchy, and Walsh (Youghal) continued the discussion, and it was pointed out that some years ago it was calculated by an official of the late Department of Agriculture that the presence of a veterinary surgeon in one of the most western and poorest districts of Munster saved to that district in live-stock over £3,000 in one year. So aware were the late Department of this fact that in many districts where no part-time veterinary inspector resided they established veterinary dispensaries, to enable the smaller owners of stock to obtain veterinary advice and assistance, and appointed veterinary lecturers to give lectures on elementary veterinary hygiene and science. Any system which would remove veterinary assistance and advice from the rural districts of Ireland was to be deplored, and would be a grevious mistake. What was now required was not an abandonment of a system of veterinary service well tried and proven by experience and tradition, but a more intensive veterinary inspection and service, both from the viewpoint of breeding and disease; and, in addition to this, though it did not appear to enter into their province, still, as members of a profession so closely allied with agriculture, they would point out that cheaper transport and the more extended use of lime upon the land would certainly quickly increase the value of Irish live-stock in quality and numbers. The live-stock trade was our greatest asset now and in the future.

"The Tuberculosis Act, as at present administered, was discussed and modifications suggested, which the hon. secretary was asked to embody in a letter, addressed to the Minister of Agriculture, the letter also to contain information and suggestions concerning the better working of the Contagious Diseases of Animals Acts under the present system, from the viewpoint of efficiency, uniformity and economy.

The meeting then adjourned."

NOTES AND NEWS.

Diary of Events.

May 21st—R.C.V.S. Voting Papers and Annual Report issued.
„ 28th—R.C.V.S. Voting Papers to be returned.
June 4th—R.C.V.S. Annual General Meeting. Earl Haig to attend to receive Diploma of Honorary Associate.
June 19th—R.A.V.C. Annual Dinner, Hotel Cecil.
July 2nd—R.C.V.S. Annual Dinner, Hotel Victoria.

Foot-and-Mouth Disease.

FRESH OUTBREAK IN CHESHIRE.

An outbreak of foot-and-mouth disease has, says *The Times* of May 7th, been confirmed on premises at Hampton, near Malpas, Cheshire. The total stock on the farm consists of 57 cattle, 67 pigs, 12 ewes, and 16 lambs, of which one cow and one bull have been found affected with the disease. The outbreak is at present regarded as serious, as it is thought that Malpas Market may have been infected. No information is available as to the origin of this outbreak, but inquiries are on foot with a view to discovering the source of infection. The slaughter of 40 cattle and all the pigs is proceeding.

The Ministry of Agriculture has made an Order imposing restrictions on the movement of animals within a radius of about 15 miles from the infected place.

In reference to the above outbreak, the agricultural correspondent of *The Daily Telegraph* says:—"The official confirmation of the presence of disease once more in Cheshire, and so near to the City of Chester, where the Royal Show is due to be held two months hence, has created some misgivings as to the fate of the cattle, sheep and pig sections at that exhibition. It would be a thousand pities if the show, over which so much money has been spent in preparation, was shorn of those three educational phases.

"Malpas, the unfortunate locality to suffer this latest outbreak of disease, of which the officials take a serious view, is in the heart of a milk-producing area where first-class Shorthorns and Friesians are utilised."

* * * * *

Mr. WOOD, Minister of Agriculture (Ripon), answering Mr. RUNCIMAN (Swansea, W., L.), who inquired, in the Commons on Monday, what was the attitude of the Government towards insurance as a means of meeting the heavy charges which outbreaks of foot-and-mouth disease threw on the taxpayer, said:—The Government would be prepared to consider any sound and workable scheme of insurance, but the question presents special difficulties, and I am not at present satisfied that any of the suggestions made would be practicable.

Obituary.

Mr. W. F. SMITH, M.R.C.V.S., Newmarket.

The death has occurred at his residence, Hurricana, Newmarket, of Mr. William Frank Smith, M.R.C.V.S., at the age of 65 years. He was a widower, and leaves no children. A native of Norfolk, he practised at Downham Market before going to America in 1888. At one time he had charge of Mr. Sanford's celebrated Hurricana Stud, at Amsterdam, New York. Mr. Smith graduated at London in 1879.

Errata.—In our last week's issue, in the heading of a report of the joint meeting of the Lancashire with other divisions, "North of England" should read "North Midland."

In the obituary notice of Mr. J. T. Taylor, "North-Eastern Division" should read "North of England Division."

CORRESPONDENCE.

Foot-and-Mouth Disease.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—In your issue of the 9th inst., dealing with the discussion on Sir Stewart Stockman's paper on Foot-and-Mouth Disease, I am reported as having said, "Sir Stewart mentions that blood is highly infectious, I am very sceptical, about that, but I cannot help wondering whether it would not be better if slaughter were dispensed with."

I will not adopt the subterfuge of the politician, and accuse the reporter of error, but accept the responsibility as being due to the lack of lucidity of my remarks.

May I state that, as regards the sentence, "blood is highly infectious," I have neither the personal knowledge, nor experience of the infectivity of the blood, so rashly to express scepticism on Sir Stewart's statement, even if I held such views, which I do not, being satisfied, on this point, to accept the opinions of those who have carefully investigated this matter.

Further, I am a whole-hearted believer in the policy of stamping out this disease by slaughter, until some well-tried and proved better method can be substituted.

On this account, I cannot imagine that I said, "I cannot help wondering whether it would not be better if slaughter were dispensed with."

Any criticism of policy which I made, was not on that of *immediate slaughter*, but on *salvage*, with its attendant delay: I wished to make clear that, if the blood were as infective as stated by Sir Stewart, I considered salvage a very questionable policy, on account of the wholesale shedding of such infective material at farms, and the carriage and shedding of potentially infected blood to wherever carcases were removed, and also by the itinerancy of the butchers employed in salving operations.

My opinions are so unimportant, that I would not request the publication of this letter, only that I do not wish your readers to believe that I doubted Sir Stewart's statement, or the wisdom of the present policy.—Yours faithfully, A. B. MATTINSON.

Friars House, Bamber Bridge, Preston.
May 11th, 1925.

The Exportation of Horses.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—When the exportation of horses from this country to the Continent is being so widely discussed in the lay Press, Mr. Mayall has done well in introducing the subject to your correspondence columns. We, of the veterinary profession, are the only body of men in the country whose main business in life is the alleviation of animal suffering, and this matter of the horse trade is one we cannot ignore until the charges of cruelty in its conduct have been rebutted. It is not only the unthinking and sentimental who make the charges; these epithets do not apply, for instance, to Mr. Cunningham-Grahame, distinguished alike in letters and horsemanship. Undoubtedly, though, much sentimental vapouring has clouded the theme, and so, being anxious to have some definite statement of the objections to the traffic, I recently obtained two pamphlets on the subject published by the R.S.P.C.A. I cannot say that the style of the pamphlets is very judicial; one passage—"there is hay on the boats, but in rough weather horses cannot eat"—is surely the very essence and quiddity of uncontrolled sentimentalism. But there are statements about lack of food and water for the horses after they are landed and about cruel methods of killing, that bother one somewhat. I agree with Mr. Mayall, that if these things are true the full facts should be given and vouched for, but I part from him when he implies that, if they are, it is a matter for France and Belgium only. We are gravely implicated, too, if we knowingly send our horses to a cruel end. At a meeting of the West of Scotland V.M.A. a year or two ago "the conditions and methods of slaughter in the continental cities was favourably commented on." (*Veterinary Record*, November 25th, 1922). Yet I remember during the war an order that British Army horses sold for slaughter were not to be left alive in continental slaughterhouses, but had to be shot there by British officers or N.C.O.'s.

There is much need, as Mr. Mayall says, for comment and discussion on the subject and among your readers there must be some who can speak from first-hand knowledge and let us have the facts.—Yours faithfully, DONALD CAMPBELL.

7 Chapel Street, Rutherglen.
11th May, 1925.

Meat Inspectors' Appointments.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—It has recently been my privilege to see several appointments for Meat Inspectors pass into the apprentice hands of the Sanitary Inspectors of the various authorities. In one instance, at least, the Veterinary Officer under the Contagious Diseases of Animals Act for the County and Borough, who had already discovered two cases of foot-and-mouth disease in carcases hung for human consumption (these cases were confirmed by the Ministry's Veterinary Officer), was deliberately passed over and the nominal sum be asked as salary was practically forced on the Acting Sanitary Inspector, whose appointments previously were legion.

I am strongly suspicious that the carcases in question were afterwards sold as food. It would be interesting to hear the opinions of other Veterinary Officers as to whether infected carcases should be consumed, also of any similar experience to my own. It is, in my opinion, rather a pity that the Ministry of Health did not appoint the Veterinary Officers under the Contagious Diseases of Animals Act as Meat Inspectors under the Public Health Act. He could then have secured the services of fully qualified men at reasonable salaries.—Yours faithfully, GEORGE ELLIS.

Glossop.

Tuberculin Testing.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—I have carried out several tests under the new intradermic and ophthalmic methods, both with the Pasteur tuberculin and with the old tuberculin P.T., (Burroughs and Wellcome), and can say that these tests are far superior to the old subcutaneous. In my opinion the measuring of the skin with calipers is not really necessary, the intradermic reaction in reacting animals being quite sufficiently defined without resorting to measurements. These tests can be expeditiously carried out, and large numbers can be tested at one time.—Yours faithfully, J. F. D. TUTT.

1 St. Cross Road, Winchester,
May 9th, 1925.

"Kirk's Dog Gag."

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—Whether or not Kirk's gag fulfils all that he claims for it has yet to be tested, but there is no doubt but that a really efficient, easily adjustable dog gag is badly needed in canine practice to-day. The old models are quite hopeless, and either drop off at a critical moment or else open the mouth to a quite unnecessary width, and the screw varieties (such as Wolf's) are only practicable with very docile dogs. If Captain Kirk's gag avoids these evils, he has fulfilled a real need and deserves every credit.—Yours faithfully, J. F. D. TUTT.

1 St. Cross Road, Winchester,
May 9th, 1925.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—I have no doubt that the remarks of Mr. Hamilton Kirk in your last issue will satisfy practical veterinary surgeons as to the value of his gag. Any further comments from me would be redundant after what has appeared from his own pen.—I am, dear Sir, yours faithfully, HENRY GRAY.

1 Redfield Lane, London, S.W.5,
May 9th, 1925.

The Editor acknowledges the receipt of the following:—Communications from Messrs. V. P. Cokhale, G. Ellis, H. Gray, J. E. Hutchinson, T. A McLintock and W. Peirson.

Army Veterinary Service.

LONDON GAZETTE. WAR OFFICE. TERRITORIAL ARMY.

May 5th—The King has been graciously pleased to confer the Territorial Decoration upon the following officers, under the terms of the Royal Warrant dated October 13th, 1920:—

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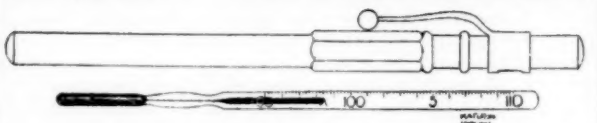

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